

Federal Greenhouse Gas Accounting and Reporting Guidance

**Recommendations to the Council on Environmental Quality
on Section 9 of Executive Order 13514**

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Acronyms

BOD	biochemical oxygen demand
CAS	Chemical Abstract Service
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHP	combined heat and power
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
DLA	Defense Logistics Agency
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
EERE	Energy Efficiency and Renewable Energy
EISA	Energy Independence and Security Act
EO	executive order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act

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EPCRA	Emergency Planning and Community Right-To-Know Act
FAQ	frequently asked questions
FAST	Federal Automotive Statistical Tool
FEMP	Federal Energy Management Program
FR	Federal Registry
FY	fiscal year
GE	goal-excluded
GHG	greenhouse gas
GOCO	government owned / contractor operated
GS	goal-subject
GSA	General Services Administration
GWP	global warming potential
HFC	hydrofluorocarbon group of gases
HVAC	heating, ventilation and air conditioning
IAPWS	International Association for the Properties of Water and Steam
ICFPA	International Council of Forest and Paper Association
IPCC	Intergovernmental Panel on Climate Change
LANDGEM	Landfill Gas Emission Model
LSEV	low speed electric vehicle
LFG	landfill gas
LMI	Logistics Management Institute
MRR	Mandatory Reporting Rule
MSDS	Material Safety Data Sheet
MSW	municipal solid waste
MT	metric tons
NMOC	non-methane organic compounds
OSMIS	Operating and Support Management Information System
NECPA	National Energy Conservation Policy Act
NERC	North American Electric Reliability Council
NF ₃	nitrogen trifluoride
N ₂ O	nitrous oxide
ODS	Ozone Depleting Substance

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OFEE	Office of the Federal Environmental Executive
OMB	Office of Management and Budget
PFC	perfluorocarbon group of gases
PNR	Passenger Name Record
POC	point-of-contact
PSS	<i>Public Sector Standard</i>
REC	renewable energy certificate
RGGI	Regional Greenhouse Gas Initiative
SF ₆	sulfur hexafluoride
TCR-LGOP	The Climate Registry's Local Government Operations Protocol
T&D	transmission and distribution
TRI	Toxic Release Inventory
TSD	Technical Support Document
UNFCCC	United Nations Framework Convention on Climate Change
USDA	U.S. Department of Agriculture
V/E	vehicles and equipment
WBCSD	World Business Council for Sustainable Development
WTE	waste-to-energy
WRI	World Resources Institute
WWTP	wastewater treatment plant

1.0 Introduction

On October 5, 2009, President Obama signed Executive Order (EO) 13514 to establish an integrated strategy towards sustainability in the Federal government and to make reduction of greenhouse gas (GHG) emissions a priority for Federal agencies. Among other provisions, EO 13514 requires agencies to “measure, report, and reduce their greenhouse gas emissions from direct and indirect activities.” Section 2 of EO 13514 provides a timeline for Federal agencies to establish GHG reduction targets and report inventories (see inset box).

Section 9 of EO 13514 directs the Department of Energy’s Federal Energy Management Program (FEMP), in coordination with the Environmental Protection Agency (EPA), the Department of Defense (DoD), the General Services Administration (GSA), the Department of the Interior (DOI), the Department of Commerce (DOC), and other agencies as appropriate, to develop recommended Federal GHG reporting and accounting procedures. Based on these recommendations, the Council on Environmental Quality (CEQ), in coordination with the Office of Management and Budget (OMB), issues this mandatory guidance for agencies to use in carrying out their GHG accounting and reporting obligations.

1.1. Purpose of this Guidance

The purpose of the Federal GHG Accounting and Reporting Guidance (or Guidance) is to establish the government-wide requirements to assist Federal agencies in calculating and reporting GHG emissions associated with agency operations. This Guidance is accompanied by a separate Technical Support Document for Federal GHG Accounting and Reporting (TSD), which provides detailed information on inventory reporting requirements and calculation methodologies.¹

By following this Guidance and subsequent revisions, individual agencies and the Federal government as a whole will be able to consistently track progress against GHG reduction goals.

EO 13514 Timeline

The head of each Federal agency shall establish and report:

Within 90 days (No later than January 4, 2010)	Percentage reduction target for scope 1 and 2 GHG emissions for fiscal year (FY) 2020 relative to a FY 2008 baseline [†]
Within 240 days (No later than June 2, 2010)	Percentage reduction target for scope 3 GHG emissions for FY 2020 relative to a FY 2008 baseline
Within 15 months (No later than January 31, 2011 for FY 2010)	FY 2008 Base Year and FY 2010 Comprehensive inventory of absolute GHG emissions, including scope 1, scope 2, and specified scope 3 emissions
FY 2011 onward: Annually, no later than January 31 (for the preceding FY)	Comprehensive inventory of absolute GHG emissions, including scope 1, scope 2, and specified scope 3 emissions

Source: EO 13514, Section 2(a), (b), and (C)

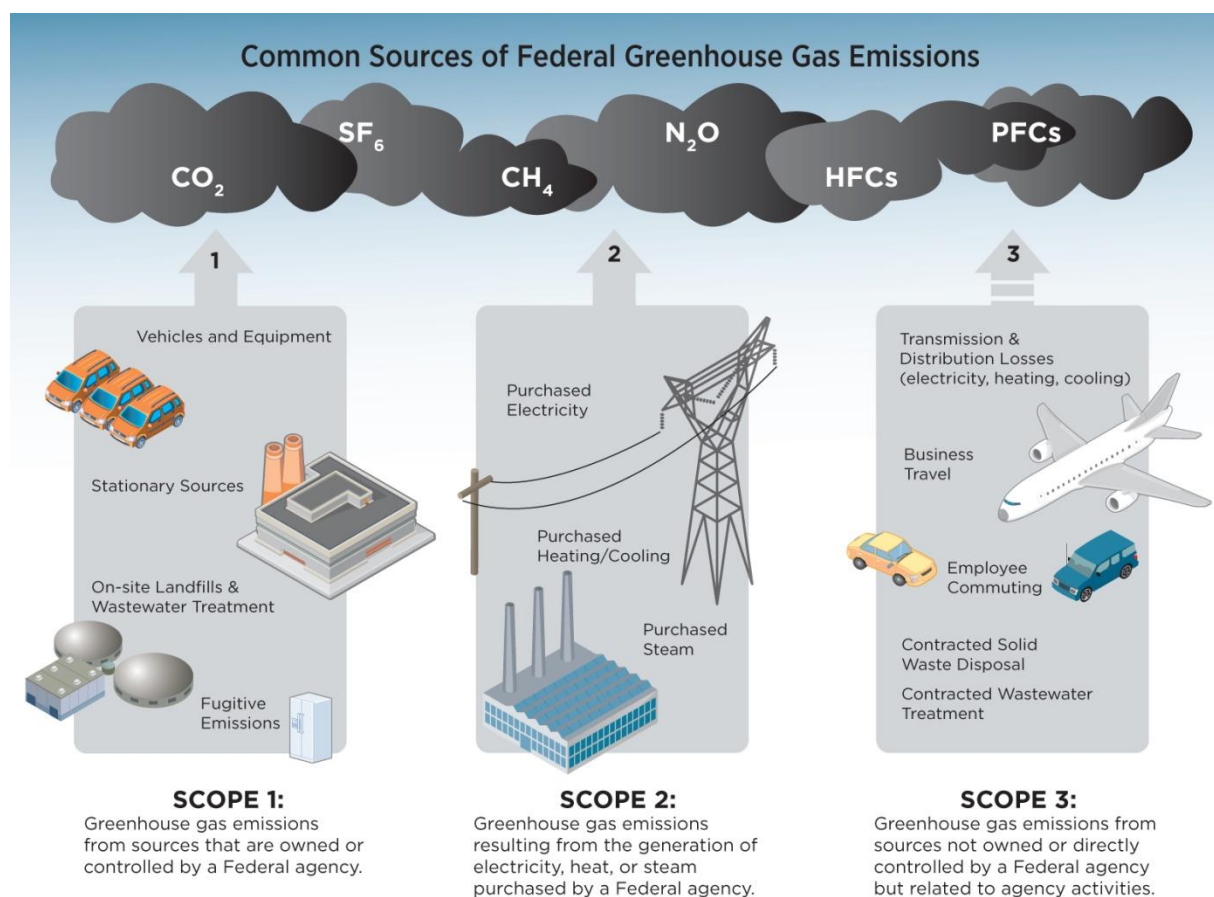
[†]Emissions are divided into scopes 1, 2, and 3, as depicted in Figure 1.

¹The TSD is available on the FEMP GHG website: www.eere.energy.gov/femp/program/greenhousegases.html

This Guidance is not designed for quantifying the reductions from individual GHG mitigation projects, nor does it include strategies for reducing GHG emissions.²

As agencies develop their GHG inventories, some questions may arise that are not addressed specifically in this Guidance. Additional information will be made available on the Federal FEMP GHG website.³ It also is anticipated that some issues or circumstances may arise that are unique to a specific Federal agency and which require additional guidance. As appropriate, other Federal agencies may provide supplemental guidance to address such issues or to provide agency-specific direction about implementation of the requirements, consistent with EO 13514 and this Guidance.

Figure 1: Scope 1, 2 and 3 Emissions



² The only emission reduction strategy discussed is the use of renewable energy purchases, including renewable energy credits, because of their unique GHG accounting and reporting issues.

³ www.eere.energy.gov/femp/program/greenhousegases.html

1.2. Introduction to GHG Reporting under E013514

Federal agencies shall report GHG emissions data to FEMP in accordance with this Guidance by January 31, 2011 for their FY 2008 base year and FY 2010 inventories, and by January 31 annually thereafter for the preceding fiscal year inventory.⁴ This section provides background information to help agencies meet this requirement and the underlying reporting procedures included in later chapters.

Relationship of the Guidance to the Public Sector GHG Accounting and Reporting Standard

While this Guidance is a stand-alone document that details procedures for federal agencies to comply with subsection 2(c) of EO 13514, it follows the basic guidelines found in the *Public Sector GHG Accounting and Reporting Standard* (Public Sector Standard, or PSS).⁵ The PSS is intended to offer flexibility to its public sector users while establishing certain core principles and methodologies that ensure consistent, complete and comparable inventories. Where any conflict exists between this Guidance and the PSS, this Guidance takes precedence.⁶

This Guidance has adopted five GHG accounting principles as the basis for ensuring that the reported information represents an accurate and fair account of each agency's GHG emissions. GHG accounting and reporting shall be based on the following principles:⁷

- **Relevance:** Ensure the GHG inventory appropriately reflects the GHG emissions of the agency and serves the decision-making needs of users—both internal and external to the agency.
- **Completeness:** Account for and report on all GHG emission sources and activities within the agency's inventory boundary. Disclose and justify any emission sources and activities not reported.
- **Consistency:** Use consistent methodologies to allow for meaningful comparisons of emissions over time.
- **Transparency:** Address all relevant issues in a factual and coherent manner. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

⁴ Agencies are not required to submit a FY 2009 comprehensive inventory, but may do so optionally.

⁵ The PSS was developed jointly by the Greenhouse Gas Protocol Initiative at the World Resources Institute (WRI), and Logistics Management Institute (LMI) through an inclusive stakeholder review process, including significant input from U.S. Federal agencies. It was released on [INSERT DATE for PSS when available]. For more information, visit <http://www.ghgprotocol.org>.

⁶ This Guidance meets the requirements of the National Technology Transfer and Advancement Act of 1995 and OMB Circular A-119, which directs agencies to use voluntary consensus standards in lieu of government-unique standards except where inconsistent with law or otherwise impractical.

⁷ Principles adapted from Chapter 1 of the PSS.

- **Accuracy:** Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

The PSS addresses possible approaches to consolidation of emissions, identifying GHG emissions sources, calculating emissions, and managing inventory quality. In order to ensure uniformity and clarity within the diverse spectrum of Federal operations, this Guidance establishes specific requirements for many of the open-ended choices outlined in the PSS. The PSS also provides valuable background information for many of the topics addressed in the Guidance. For those topics, footnotes are included throughout this document to identify relevant chapters in the PSS.

Carbon Dioxide Equivalent and EO 13514 GHGs

The different GHGs shown in Figure 1 have varying heat-trapping abilities and atmospheric lifetimes. To facilitate comparison among GHGs, a global warming potential (GWP) value is assigned to each GHG. GWP represents the heat-trapping impact of a GHG relative to carbon dioxide, which has a GWP of 1.0, and functions as a warming “index.” For instance, methane has a GWP of 21, so each metric ton of methane emissions has 21 times as much impact on global warming (over a 100-year time horizon) as one metric ton of carbon dioxide emissions.

To provide a single metric that embodies all GHGs, emissions are reported in metric tons of carbon dioxide equivalent (CO₂e). To calculate CO₂e, the mass of emissions from each GHG is multiplied by the appropriate GWP for that gas. See Table 1 for the list of GHGs covered under EO 13514, common sources, and their associated GWPs.

Agencies may elect to inventory GHGs beyond those required by EO 13514. For example, agencies may consider nitrogen trifluoride (NF₃) or other GHGs as they become more prevalent due to manufacturing changes or other factors.

Table 1: GHGs, Common Sources, and Global Warming Potentials

Greenhouse Gas	Common Sources/Uses	GWP*
Carbon dioxide (CO ₂)	Mobile and stationary combustion	1
Methane (CH ₄)	Coal mining and fuel combustion	21
Nitrous oxide (N ₂ O)	Fuel combustion, fertilizers	310
Hydrofluorocarbon group of gases (HFCs)	Refrigerants, fire suppressants, various manufacturing processes	140-11,700 [†]
Perfluorocarbon group of gases (PFCs)	Electrical equipment, various manufacturing processes, refrigerants, medicine	6,500-17,700 [†]
Sulfur hexafluoride (SF ₆)	Electrical equipment, various manufacturing processes, tracer in air modeling, medicine	23,900
*100-year Global Warming Potential. Source: EPA MRR [74 Federal Registry (FR) 56260]. Also see the TSD for additional information.		
[†] Many different individual gases make up HFCs and PFCs, so there is a range of GWP values associated with each.		

For additional information about GWP values and associated lifetimes, see EPA's website at: <http://www.epa.gov/highgwp/scientific.html>.

Exclusions and Exemptions

Section 2(a) of EO 13514 delineates specific sources of emissions that *may* be excluded from an agency's GHG reduction targets (established in accordance with Sections 2(a) and 2(b) of the EO). Agencies are strongly encouraged to minimize their use of allowable exclusions from their reduction targets. Activities excluded from an agency's GHG targets shall still be reported in the agency's comprehensive GHG inventory. Sources of emissions that may be excluded from reduction targets per EO 13514 include:

- any vehicle, vessel, aircraft, or non-road equipment owned or operated by an agency of the Federal Government that is used in:¹¹
 - combat support, combat service support, tactical or relief operations, or training for such operations;
 - Federal law enforcement (including protective service and investigation);
 - emergency response (including fire and rescue); or
 - spaceflight vehicles (including associated ground-support equipment);
- electric power produced and sold commercially to other parties in the course of regular business¹²

Per Section 17 of EO 13514, the head of an agency can choose to include personnel, resources, and facilities that are not located within the United States in their reduction targets and/or comprehensive inventories.

EO 13514 authorizes heads of agencies to exempt certain activities from the mandates in the EO, including GHG reporting. Agencies should refer to Section 18 of the EO for those procedures.

Users of this Guidance

Although the EO requires Federal agencies to submit agency-wide GHG emissions inventories for each fiscal year on an annual basis, many Federal agencies are composed of multiple facilities, subordinate agencies, or divisions. The data required to develop an agency-wide inventory will likely be drawn from these multiple levels within an agency's organizational structure. This Guidance has been developed to provide Federal agency users, whether representing facility-level activities or headquarters-level functions, with the necessary information to fulfill reporting requirements. Some Federal agencies may elect to develop supplemental guidance, as appropriate, to provide additional clarification and develop processes for their facilities to facilitate consistent and accurate reporting.

¹¹ Per Section 19(h) of EO 13514, which defines the "excluded vehicles and equipment" that are introduced in Section 2(a)

¹² Allowable exclusion also includes the emissions associated with transmission and distribution of such electric power.

Two general approaches (centralized and decentralized) are commonly used to develop a single inventory for agencies that encompass multiple operating units. This Guidance provides calculation and reporting methodologies applicable to either approach to compiling a GHG inventory.¹³ Regardless of the approach used to develop a GHG inventory, the data shall be rolled up to an aggregate headquarters level for reporting.

GHG Reporting Portal

In accordance with Section 9(b) of the EO, DOE FEMP in consultation with other agencies will develop an electronic reporting capability, or GHG Reporting Portal, for agencies to use in reporting all GHG inventory information required by subsection 2(c) of EO 13514. In addition, the GHG Reporting Portal will allow agencies to report additional information above and beyond the requirements. Where possible, this portal will automatically calculate emissions, using methodologies contained in the TSD, from aggregated agency-level activity data reported by the agency. This will limit the burden on reporting agencies and facilitate comparable and consistent inventories. The existence of the portal does not preclude agencies from using tools of their choosing to manage and maintain inventories. However, final reporting shall be done through the GHG Reporting Portal. Chapter 5 and the TSD provide additional information about the GHG Reporting Portal.

Federal GHG Accounting and Reporting Workgroup

Following the issuance of this Guidance, CEQ will convene a Federal GHG Accounting Workgroup to address issues that may arise in its implementation and ongoing development of procedures and guidance.

The GHG Workgroup's mission is to:

- Serve as a forum for information exchange and promote agency implementation of this Guidance;
- Develop GHG accounting and reporting guidance recommendations that fosters the successful development of GHG inventories in the Federal sector;
- Develop technical guidance and tools to support implementation of this Guidance; and
- Address inconsistencies between current data collection processes and those needed to support GHG accounting best practices.

The Workgroup will convene in FY 2010, and provide recommendations to CEQ for either an addendum to this Guidance, or revisions as a revised document for FY 2011.

This Workgroup will be chaired by DOE FEMP, and include participation from all Federal agencies. It will meet and form subcommittees as necessary.¹⁴ The group will work closely with

¹³ For further information, please refer to Chapter 6 of the PSS.

¹⁴ Examples of topics that could be addressed by subcommittee include scope 3 data collection, additionality requirements for renewable energy purchases, vendor and contractor emissions (the group working on Section 13 of EO 13514), organizational boundaries (including leased assets), and emissions and biological sequestration from land management techniques.

OMB and the Office of the Federal Environmental Executive (OFEE), who provide oversight on Executive Branch Management Scorecards and implementation of EO 13514.

This GHG Workgroup will also coordinate closely with other EO 13514 Working Groups, relevant government programs, and non-Government stakeholders as necessary.

1.3. Relationship of the Guidance to EO 13514 Sections

Developed in response to Section 9 of EO 13514, this Guidance provides GHG accounting and reporting procedures to enable Federal agencies to meet the requirements of Section 2(c) of the EO on GHG inventory reporting. The Guidance also addresses and references other sections of EO 13514, as appropriate. Table 2 describes the GHG-related provisions of EO 13514 and the associated sections of this Guidance.¹⁵

Table 2: Summary of EO 13514 Sections Addressed in the Guidance

Key EO 13514 Provisions Relevant to GHG Reporting	Role of this Guidance
Section 1. Policy <ul style="list-style-type: none">Federal agencies shall... measure, report, and reduce their GHG emissions from direct and indirect activitiesAgencies' efforts and outcomes in implementing this order shall be transparent and agencies shall publicly disclose results	<ul style="list-style-type: none">Establishes how to measure and report agency GHG emissions from direct and indirect activitiesSupports consistency of dataGHG results incorporated into FEMP annual report
Section 2a. Goals for Agencies (Scope 1 and 2 Emissions) <ul style="list-style-type: none">Establish and report... a percentage reduction target for reducing agency-wide scope 1 and 2 GHG emissions in absolute terms by FY 2020, relative to a FY 2008 baseline of agency's scope 1 and 2 GHG emissionsWhere appropriate, the target shall exclude direct emissions from excluded vehicles and equipment and from electric power produced and sold commercially to other parties in the course of regular business	<ul style="list-style-type: none">Progress in meeting scope 1 and 2 targets will be determined by completing an FY 2008 base year inventory and subsequent annual inventories using this GuidanceClarifies how allowable target exclusions relate to GHG reporting.
Section 2b. Goals for Agencies (Scope 3 Emissions) <ul style="list-style-type: none">Establish and report... a percentage reduction target for reducing agency-wide scope 3 GHG emissions in absolute terms by FY 2020, relative to a FY 2008 baseline of agency scope 3 emissionsAgency head shall consider reductions associated with: (i) pursuing opportunities with vendors and contractors to address and incorporate incentives to reduce GHG emissions; (ii) implementing strategies and accommodations for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff; (iii) GHG emission reductions associated with pursuing other relevant goals in this section; and (iv) developing and implementing innovative policies and practices to address scope 3 GHG emissions unique to agency operations	<ul style="list-style-type: none">Progress in meeting scope 3 targets will be determined by completing an FY 2008 base year inventory and subsequent annual inventories using this GuidanceProvides calculation methodologies for scope 3 emission sources

¹⁵ Refer to the full text of EO 13514 at <http://www.ofee.gov/execorders.asp>.

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Key EO 13514 Provisions Relevant to GHG Reporting	Role of this Guidance
Section 2c. Goals for Agencies (comprehensive inventory)	<ul style="list-style-type: none"> Provides methodologies for calculating and reporting comprehensive GHG inventory of scope 1, scope 2, and specified scope 3 emissions
<ul style="list-style-type: none"> Establish and report... a comprehensive inventory of absolute greenhouse gas emissions, including scope 1, scope 2, and specified scope 3 emissions (i) within 15 months of the date of this order for FY 2010; and (ii) thereafter, annually at the end of January, for the preceding FY 	
Section 8. Agency Strategic Sustainability Plan	<ul style="list-style-type: none"> Identifies procedures that may be incorporated into Strategic Sustainability Performance Plans as a means to monitor performance in meeting GHG reduction targets
<ul style="list-style-type: none"> Each agency shall develop, implement, and annually update an integrated Strategic Sustainability Performance Plan that will prioritize agency actions based on life-cycle return on investment. 	
Section 9a. Recommendations for GHG Accounting and Reporting	<ul style="list-style-type: none"> Includes GHG reporting and accounting procedures for scope 1, 2, and 3 sources, where accurate methodologies exist Addresses inventory recalculation based on changes in factors affecting agency emissions (see Chapter 5) Addresses sequestration (see Chapter 3)
<ul style="list-style-type: none"> The DOE, through its Federal Energy Management Program, and in coordination with EPA, DoD, GSA, DOI, DOC, and other agencies as appropriate, shall: (a) within 180 days develop and provide recommended Federal GHG reporting and accounting procedures for agencies to use in carrying out their obligations under subsections 2(a), (b), and (c) of this order, including procedures that will ensure that agencies: <ul style="list-style-type: none"> (i) accurately and consistently quantify and account for GHG emissions from all scope 1, 2, and 3 sources, using accepted GHG accounting and reporting principles, and identify appropriate opportunities to revise the FY 2008 baseline to address significant changes in factors affecting agency emissions such as reorganization and improvements in accuracy of data collection and estimation procedures or other major changes that would otherwise render the initial baseline information unsuitable; (ii) consider past Federal agency efforts to reduce GHG emissions; and (iii) consider and account for sequestration and emissions of GHGs resulting from Federal land management practices 	
Section 9b. Recommendations for GHG Accounting and Reporting	<ul style="list-style-type: none"> DOE will provide electronic accounting and reporting capability (GHG Reporting Portal) by October 5, 2010 Addresses the GHG Reporting Portal and how it relates to this Guidance (see Chapter 5)
<ul style="list-style-type: none"> The DOE, through FEMP, and in coordination with EPA, DoD, GSA, DOI, DOC, and other agencies as appropriate, shall: (b) within 1 year, to ensure consistent and accurate reporting, provide electronic accounting and reporting capability for the Federal GHG reporting procedures developed under subsection (a) of this section, and to ensure compatibility between this capability and existing Federal agency reporting systems. 	
Section 9c. Recommendations for GHG Accounting and Reporting	<ul style="list-style-type: none"> Revised Guidance will likely be issued in FY 2011, and as otherwise necessary
<ul style="list-style-type: none"> The DOE, through its Federal Energy Management Program, and in coordination with EPA, DoD, GSA, DOI, DOC, and other agencies as appropriate, shall: (c) every 3 years from the date of issuance of the initial version of the reporting guidance, and as otherwise necessary, develop and provide recommendations for revised Federal GHG reporting procedures use in implementing subsections 2(a), (b), and (c) of this order. 	
Section 13. Recommendations for Vendor and Contractor Emissions	<ul style="list-style-type: none"> Provides calculation methodologies for selected scope 3 emissions, but not all vendor and contractor emissions (Section 13 recommendations do not include calculation methodologies)
<ul style="list-style-type: none"> Within 180 days, GSA in coordination with DoD, EPA, and other agencies as appropriate, shall review and provide recommendations... regarding the feasibility of working with the Federal vendor and contractor community to provide information that will assist Federal agencies in tracking and reducing scope 3 GHG emissions related to the supply of products and services to the Government. 	
Section 17. Limitations	<ul style="list-style-type: none"> Clarifies how “limitations” relate to GHG reporting.
<ul style="list-style-type: none"> This order shall apply to an agency with respect to the activities, personnel, resources, and facilities of the agency that are located within the United States. The head of an agency may provide that this order shall apply in whole or in part with respect to the activities, personnel, resources, and facilities of the agency that are not located within the United States... 	

Key EO 13514 Provisions Relevant to GHG Reporting	Role of this Guidance
Section 18. Exemption Authority	<ul style="list-style-type: none">• Clarifies how “exemption authority” relates to GHG reporting.
<ul style="list-style-type: none">• The Director of National Intelligence may exempt an intelligence activity of the United States, and related personnel, resources, and facilities• Authorizes heads of agencies to exempt certain activities, facilities, equipment, and vehicles (e.g., intelligence, law enforcement, protective emergency response, military tactical fleets, and national security interests) from the provision of the order (other than Sections 18 and 20).• The head of an agency may exempt law enforcement activities of that agency, and related personnel, resources, and facilities...	
Section 19. Definitions	<ul style="list-style-type: none">• Includes relevant definitions from EO 13514 and other sources
<ul style="list-style-type: none">• EO 13514 includes definitions	

1.4. Relationship of the Guidance to other GHG Regulations and Programs

The GHG reporting requirements of EO 13514 build upon the provisions of previous statutes, regulations, and EOs to which Federal agencies are subject, such as EPA’s Mandatory Reporting of Greenhouse Gases Rule (MRR), finalized in 2009 (74 FR 56260). Some agencies also report their GHG emissions through voluntary programs, such as EPA Climate Leaders and DOE’s voluntary GHG reporting program established under Section 1605[b] of the Energy Policy Act of 1992. Other agencies have independently developed GHG inventories to support their own understanding of their GHG contribution and opportunities for emissions reduction (e.g., the National Park Service’s Climate Friendly Parks program). To reduce the data collection and reporting burden on Federal agencies and take advantage of this existing groundwork, the methodologies and procedures defined in this document have been adapted, where possible, from established accounting and reporting methodologies. Preference was given to existing procedures established by the Federal government. In the absence of such methodologies, other accepted sources were utilized, as appropriate.¹⁶

Agencies should be cognizant of potential variability in reporting requirements among these programs. This section describes the relationship of this Guidance to existing regulations and programs that relate to Federal GHG accounting and reporting.

Federal Statutory and Executive Order Requirements

EO 13514 builds upon several existing Federal statutory and EO requirements related to energy and environmental management. Existing mandates include the National Energy Conservation Policy Act (NECPA) of 1978, the Energy Policy Act of 2005 (EPAct 2005), the Energy Independence and Security Act (EISA) of 2007, and EO 13423 of 2007. These mandates have established various goals for energy management, renewable energy use, and other activities that may reduce GHG emissions, but none have specifically required comprehensive reporting of GHG emission inventories or establishment of targets for reduction of emissions. Further

¹⁶ This approach is consistent with the National Technology Transfer and Advancement Act of 1995 and OMB Circular A-119, which direct Federal agencies to use standards developed or adopted by voluntary consensus bodies, except where it would be inconsistent with Federal law.

description of each statute, as well as a cross-walk of sustainability requirements among EO 13514 and previous statutes, can be found at:
www.eere.energy.gov/femp/regulations/regulations.html.

This Guidance also considers the EPA MRR, which requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Where possible, this Guidance references calculation methodologies and emission factors in the EPA MRR. Although efforts have been undertaken to streamline reporting requirements by adopting or referencing appropriate elements of the MRR, agencies should understand that the requirements of this Guidance are separate and distinct from those of the EPA MRR. For additional information on the MRR, visit:
<http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>.

State and Regional Programs

In addition to the requirements established under EO 13514 and the EPA MRR, some agency facilities may also be subject to state-level GHG emissions reporting or reduction requirements. Some individual states have adopted legislation that requires GHG emissions reporting above a specified threshold, or they incorporate GHG reporting as part of permitting processes. For example, the State of Wisconsin requires emissions reporting for entities emitting greater than 100,000 tons of CO₂ per year.¹⁷ Facilities should consult with appropriate agency personnel to determine the applicability and requirements of state programs.

Some of the state-based GHG reporting requirements are also used in reporting for regional programs. For example, the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort by ten states in the Northeast and Mid-Atlantic region, utilizes individual state programs and regulations to function as a single regional compliance market for carbon emissions. These states have capped CO₂ emissions from the power sector, and will require a 10 percent reduction in emissions by 2018. Agencies are only impacted by the regional reporting requirements insofar as they lead to state-based reporting to which facilities may be subject.

International Reporting

In June 1992, the United States signed, and later ratified, the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC entered into force on March 21, 1994. The Convention establishes requirements for reporting national GHG inventories of emissions and removals. As a result, some Federal agencies provide information regarding GHG emissions that is incorporated into the U.S. Climate Action Report.

1.5. Overview of Guidance

The remaining chapters of this Guidance and the TSD cover the following key topics:

Chapter 2: Setting Organizational and Operational Accounting Boundaries

¹⁷ For details on other GHG reporting programs, please refer to Appendix A of the PSS.

- Provides guidance about facilities, vehicles, and other activities that are included in an agency's inventory.
- Categorizes emissions sources as either direct (scope 1) or indirect (scope 2 or scope 3), and establishes which emission sources are required for reporting in FY 2010 and FY 2011.

Chapter 3: Sequestration and Emissions from Land Use, Agriculture and Biogenic Sources

- Clarifies two categories of biogenic emissions (biofuels combustion and biomass combustion) that are required for reporting.
- Addresses land-use, biological sequestration, and agricultural emissions.

Chapter 4: Renewable Energy and Carbon Offsets

- Explains how Federal agencies may reduce their scope 2 emissions through renewable energy purchases.
- Addresses emissions benefits from generating on-site renewable energy.
- Provides information about carbon offsets.

Chapter 5: Reporting

- Describes the Federal GHG reporting approach and the GHG Reporting Portal.
- Describes the use of calculation methodologies and emission factors.
- Clarifies the process for recalculating base year and subsequent year GHG inventories.

Chapter 6: Verification and Validation of GHG Emissions

- Addresses minimum agency and FEMP requirements for inventory verification.
- Describes options associated with quality assurance and third-party verification.

Appendix: Definitions

- Provides definitions for key terms used in this Guidance.

Technical Support Document

The TSD provides detailed technical information supporting implementation of this Guidance, including:

- Describes the function of the GHG Reporting Portal;
- Outlines the qualitative data content required for GHG reporting;
- Establishes the “minimum required” and “detailed” methodologies and data inputs for calculating scope 1, scope 2, and specified scope 3 emissions; and
- Provides emission factors used in the calculation of scope 1, 2, and 3 emissions.

Sources of Additional Information

Additional sources of information are referenced throughout this Guidance and will be made available on the FEMP GHG website, at www.eere.energy.gov/femp/program/greenhousegases.html. The site will maintain documents and provide updates and other information related to this Guidance, such as:

- The TSD;
- Frequently Asked Questions (FAQs) on the Guidance;
- Comparison of this Guidance and other GHG reporting programs;
- Instructions on using the GHG Reporting Portal when it becomes available;
- List of inventory tools and additional information resources; and
- Key points of contact.

2.0 Setting Organizational and Operational Accounting Boundaries

Setting organizational and operational accounting boundaries is necessary to develop an agency-wide GHG inventory. Organizational boundaries define which operations, facilities, and sources are controlled by an agency. For example, depending on how they are applied, organizational boundaries determine whether the landlord or tenant should be responsible for reporting emissions associated with the operation of a leased building. Once the organizational boundaries are set, operational boundaries are used to categorize emissions as resulting either directly or indirectly from agency activities. This chapter outlines how agencies shall set their organizational and operational boundaries for compliance with EO 13514.

Typically, organizational boundaries are defined by either the operational or financial control an entity has over its various activities.¹⁸ However, the EO's mandate to begin aggressively inventorying emissions from Federal activities, while taking advantage of available data collection processes (to avoid undue burden on agency resources), necessitates a unique approach to defining organizational boundaries. The approach detailed in Chapter 2.1 below adheres to the accounting principles outlined in Chapter 1.2, and avoids double counting and gaps in GHG accounting.

Procedures for defining organizational boundaries for GHG emissions accounting may be revised for future reporting years. Updates to this Guidance to incorporate these revisions will be recommended by the Federal GHG Workgroup. This includes addressing the issues posed by leased assets to ensure that both landlords and tenants in GSA and private sector leases are appropriately incentivized to reduce the GHG emissions in those facilities.

2.1. Organizational Boundaries

Agencies shall report the emissions associated with all of the activities that fall within their organizational boundaries, as defined by this Guidance. The specific categories of emissions to inventory include scope 1, scope 2, specified scope 3, and other emissions reported outside of the scopes, which are defined in Chapter 2.2.

For the FY 2008 base year and FY 2010 GHG inventory, agencies shall include the following within their organizational boundaries:

- **The activities related to the operation of facilities for which they directly pay electricity bills.** The energy-related activity data required to calculate these emissions are currently reported to FEMP for compilation in the Annual Report on Federal Government Energy Management (or FEMP Energy Report).
- **The operation of mobile sources for which the agency purchases fuel.** These mobile sources include Federal fleets (as described in Section 12 of EO 13514), equipment, non-road vehicles, vessels and aircraft. The activity data needed to

¹⁸ For further information, please refer to Chapter 3 of the PSS.

calculate emissions from Federal fleets are reported in the FAST (Federal Automotive Statistical Tool) system, and the emissions from equipment, non-road vehicles, vessels, and aircraft are currently captured in the FEMP Energy Report.¹⁹

- **All other scope 1 and 2 activities over which the agency has operational control.** These include fugitive and process emissions as defined in Chapter 2.2.1. Data for these emissions is typically collected at the activity level. Specified scope 3 emissions in an agency's organizational boundary, where the agency does not have full operational control, are described in Chapter 2.2.3.

2.1.1. Electricity Bills

If an agency directly pays the utilities in its leased space (i.e., the agency leases from GSA or a private landlord), then it shall report the associated emissions. Reporting on leased buildings may pose some difficulty depending on the nature of the lease (e.g., partially serviced or fully serviced). If an agency leases space from GSA and does not directly pay utilities, GSA is responsible for reporting the emissions associated with those utilities. For such leases with a private landlord, agencies may optionally report the emissions.²¹ Therefore, if all agency space is leased in this manner, and the agency does not pay any energy bills, the agency is not required to report any related emissions.

If an agency has been delegated responsibility by GSA for operation and maintenance of occupied buildings, and thus directly pays the utilities, the agency is required to report associated emissions for these buildings. This approach aligns with FEMP energy reporting.

Similarly, agencies that currently include operations that are government owned/contractor operated (GOCO) in their FEMP Energy Report shall include the associated emissions in their inventory. For GOCO operations not currently reported, agencies may optionally report these emissions in their inventory.

GHG Reporting Relationship to Facility Energy Reporting

To the extent possible, this Guidance maintains consistency with the current approach in the FEMP Energy Report, in which an agency reports energy use that it directly purchases from utilities and other providers. However, EO 13514 exclusions allowable for GHG reduction targets, as outlined in Chapter 1.2, are **not** the same as those allowable under FEMP's "Guidelines Establishing Criteria for Excluding Buildings" from the energy intensity reduction goal (30 percent reduction in Btu/square foot in 2015 compared to 2003).²³ The relationship between energy goal reporting exclusions and allowable GHG target exclusions is summarized in Table 3.

¹⁹ Federal fleet vehicles and low speed electric vehicles (LSEVs) are considered to be mobile sources. Electricity used in these vehicles is reported in the FAST system, and should not be included in facility energy use.

²¹ Private landlords are not responsible for reporting GHG emissions under EO 13514. For future years, it is anticipated that Federal Government tenants will report GHG emissions from privately leased facilities, pursuant to methodologies developed by the Federal GHG Workgroup.

²³ This guidance can be found at www1.eere.energy.gov/femp/pdfs/exclusion_criteria.pdf.

Table 3: Building Exclusion Comparison

Type of Building/Structure as defined in FEMP's "Guidelines Establishing Criteria for Excluding Buildings" for determining allowable EPA Act Goal exclusions	May these activities be excluded from EO 13514 GHG Reduction Targets?
Buildings that are privately owned but happen to be co-located on Federal lands or military installations and are not leased by the government	Yes [*]
Buildings with Fully-Serviced Leases (where the private sector landlord is responsible for paying the energy bills)	Yes [*]
Structures such as outside parking garages which consume essentially only lighting energy, yet are classed as buildings.	No
Federal ships that consume "Cold Iron Energy," (energy used to supply power and heat to ships docked in port) and airplanes or other vehicles that are supplied with utility-provided energy. [†]	No
Buildings in which energy usage is skewed significantly due to reasons such as: buildings entering or leaving the inventory during the year, buildings down-scaled operationally to prepare for decontamination, decommissioning and disposal, and buildings undergoing major renovation and/or major asbestos removal.	No
Leased space where the Government may pay for some energy but not all, the space comprises only part of a building (i.e., leased space where rent is net of utilities), or the expiration date of the lease limits the ability to undertake energy conservation measures.	No
Separately-metered energy-intensive loads that are driven by mission and operational requirements, not necessarily buildings, and not influenced by conventional building energy conservation measures.	No
Federal Buildings Excluded from Energy Performance Requirements, where (1) energy requirements are impracticable, (2) all Federally required energy management reports have been completed and submitted, (3) Agency has achieved compliance with all energy efficiency requirements; and (4) Implementation of all practicable, life cycle cost-effective projects at the excluded building(s)	No [‡]
[*] Reporting for these building types is not required for an agency's comprehensive GHG inventory at this time. Reporting guidance on fully serviced leases to be developed for FY 2011 reporting. [†] Unless they are classified as excluded vehicles and equipment in the EO. [‡] Except where the finding of impracticability is based on performance of a national security function.	

2.1.2. Purchased Fuel

Agencies are responsible for including in their inventories the emissions from mobile sources associated with the operation of vehicles and equipment for which they purchase fuel.

GHG Reporting Relationship to FAST Reporting

For FY 2010 reporting, the majority of fleet data required for calculating mobile combustion emissions is the fuel reported in the FAST system. Tables 1-3 and 1-4 of the “Guidance for Federal Agencies on EO 13514 Section 12 – Federal Fleet Management” lists the owned and contracted vehicles that agencies *may* consider exempt from covered fleets. These are the same allowable exclusions for an agency’s GHG targets, except for non-road vehicles which shall be included (see below).

The data reported into FAST will be used to calculate the resulting GHG emissions using the methodologies outlined in the TSD. The GHG Reporting Portal will automatically calculate the resulting GHG emissions.

In addition, emissions from the following mobile combustion sources (currently captured in FEMP energy reporting, and not the FAST system), shall be subject to the reduction target and be reported in the agency’s comprehensive inventory:²⁵

- Small equipment (e.g., lawnmowers) and non-road vehicles (e.g., agriculture equipment);
- Vessels and aircraft that are not considered excluded vehicles and equipment systems (e.g., research aircraft, non-tactical ships).

2.1.3. All Other Activities

For all other agency activities, agencies shall use the operational control approach to determine their organizational boundaries. Agencies have operational control over an activity if they have the authority to implement operating policies. These include, but are not limited to fugitive and process emission sources (as defined in Chapter 2.2.1). For fugitive and process emissions, the agency that pays for purchase and maintenance of the emitting equipment reports the emissions.

Agencies engaged in complex property management arrangements must also determine how the associated emissions should be accounted for. Table 4 shows how agencies are to account for emissions that result from activities that take place on or with property managed through various arrangements.

²⁵ Most agencies did not include these types of operations in their scope 1 and 2 targeting. Although data availability for these activities may currently be limited, they are subject to agency reduction targets and agencies should work to the greatest extent feasible to address those data limitations for future inventories.

**Table 4: Assigning Emissions for Property Arrangements
from Reporting Agency's Perspective**

Type of arrangement	Definition	Applicable Scopes
Permit	The agency confers a permit to a private party for the use of government land	Scope 3 (Optional)
Outgrant	An easement, lease or license granted by the agency to a non-federal entity for either a temporary or permanent use	Scope 3 (Optional)
Grant	The agency confers a grant permanently authorizing the use of a given right-of-way to a third party. Grants usually involve a single payment for the land or transfer of land use rights.	Scope 3 (Optional)
Withdrawal from Public Use	The agency receives a permit to use land of another government agency for up to 20 years administratively, as long as the intended use does not involve destruction of the land (i.e., military uses, dams)	Scopes 1 and/or 2
Public-Private Partnership	Partnerships in which the agency and a private entity contribute various amounts of real property, financial capital, and/or borrowing ability for the purpose of establishing operating capacity	Varies [†]
Government remediation of private sites	The government may be responsible for the energy use associated with environmental remediation of private sites	Scope 3 (Optional)
[†] Reporting of scopes depends on the agreements made between the partners, and varies from agreement to agreement. Agencies determine which scope to report, if any, based on whether or not they purchase energy or exercise operational control for the partnership.		

2.2. Operational Boundaries: Scopes

Once agencies determine which operations fall within their organizational boundaries, they categorize emissions sources as either direct (scope 1), indirect (scope 2 or scope 3), or other reporting. Calculation methodologies for scope 1, 2, and 3 emissions are detailed in the TSD.

2.2.1. Direct Emissions: Scope 1

Agencies shall account for the emissions from equipment or operations within their organizational boundary that directly produce GHGs as scope 1. Agencies are required to report scope 1 emissions in their base year and subsequent annual GHG inventories.²⁷

Scope 1 emissions result primarily from the following types of activities:

²⁷ CEQ acknowledges that agencies may not be able to collect all fugitive and process emission data for the FY 2008 base year inventory and FY 2010 inventory. Agencies should do so to the best of their ability, with the goal of continuous improvement over time.

- **Generation of electricity, heat, cooling, or steam:** Emissions that result from combustion of fuels in stationary sources (e.g., boilers, furnaces, turbines, and emergency generators). This includes CH₄ and N₂O emissions from biomass combusted for production of electricity, heat, cooling, or steam.
- **Mobile sources:** Emissions that result from the combustion of fuels in agency controlled mobile combustion sources (e.g., automobiles, ships, and aircraft), including Federal fleet vehicles (including GSA leased, commercially leased, and agency owned vehicles).²⁸ This includes CH₄ and N₂O emissions from biofuel combustion.
- **Fugitive emissions:**²⁹ Emissions that result from intentional or unintentional releases of GHGs from within the agency's organizational boundary (e.g., equipment leaks from joints, seals, packing, and gaskets; landfills and wastewater treatment plants; HFC emissions from the use of refrigeration and air conditioning equipment; methane leaks from gas transport; and SF₆ emissions from leaking electrical equipment; CH₄ emissions from coal mines and venting).
- **Process emissions:** Emissions that result from the manufacture or processing of chemicals and materials, and laboratory activities.

Biomass and biofuel combustion also result in GHG emissions, which are required in scope 1 reporting. Emissions resulting from manure management and enteric fermentation, where the animals in question are owned by the federal agency, are optionally reported in scope 1 at this time. See Chapter 3 for more information on these sources, and the TSD for information on reporting requirements, calculation methods, data sources, and example calculations for biomass and biofuels.

2.2.2. Indirect Emissions: Scope 2

Agencies shall account for indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling as scope 2. These emissions are a consequence of activities that take place within the organizational boundaries of the reporting agency, but physically occur at the facility where the electricity, steam, heating, and/or cooling is generated. Agencies shall report all scope 2 emissions in their base year and subsequent annual GHG inventories.

Emissions related to the electricity purchased for Federal fleet electric vehicles, including low speed electric vehicles (LSEVs), are scope 2 emissions. Current policies stipulate that the electricity used in these vehicles is reported as part of alternative fuel use through the FAST system and is included in facility electricity reporting. This electricity will not be double counted in the GHG Reporting Portal.

²⁸ These do not include rental vehicles.

²⁹ Note that "fugitive emissions" as defined in this Guidance document are not intended to coincide with other statutory uses of the term.

Agencies that purchase electricity shall report indirect emissions associated with transmission and distribution (T&D) losses in scope 2 only for T&D operations they control. Other indirect T&D losses are required in scope 3 reporting (see Chapter 2.2.3).

2.2.3. Other Indirect Emissions: Scope 3

Scope 3 includes all other indirect emissions not included in scope 2. Scope 3 emissions are a consequence of the agency's activities, but originate from sources outside of the organizational boundary. For FY 2010, agencies shall report a selected set of scope 3 emissions, as outlined below. These selected scope 3 emissions are the same sources required for the scope 3 targeting.

Many scope 3 emissions can at first be difficult to calculate due to a lack of available data. However, EO 13514 seeks to demonstrate leadership and help inform others' efforts to implement GHG accounting and reduction programs by addressing some of these challenges. Because efforts to account for scope 3 emissions are only recently emerging, this Guidance utilizes a phased approach to developing scope 3 inventories. Initial efforts focus on accounting for scope 3 categories for which reliable and accessible data are available for estimating emissions, and for which more detailed calculation methodologies have been established. The key is to improve scope 3 data quality over time.

CEQ acknowledges that some agencies will have limited available data for FY 2010 reporting. Therefore, for FY 2008 base year and FY 2010 annual inventory reporting, agencies shall report scope 3 emissions associated with:

- Federal employee business air travel
- Contracted solid waste disposal
- The T&D losses related to purchased electricity, steam, and heating/cooling

Calculation methodologies for each of these emission categories are detailed in the TSD.

For FY 2011 reporting, agencies shall also report scope 3 emissions associated with:

- Federal employee commuting
- Federal employee business travel by ground (rail, vehicles, bus)
- Contracted wastewater treatment
- Facilities operated under private sector and GSA leases

While not required for FY 2010 reporting, agencies are encouraged to report and reduce these scope 3 emissions, especially if baseline data is available. Calculation methodologies for each of these emission categories, except for private sector and GSA leases, are detailed in the TSD.

It is also important to ensure that agency progress in reducing scope 3 emissions reduction targets can be tracked in the GHG Reporting Portal. Therefore, for FY 2008 base year and FY 2010 reporting, agencies shall also report emissions for those scope 3 categories where the agency quantified a baseline (in terms of MTCO₂e) in the scope 3 target tool.³¹ If an agency

³¹ Agency scope 3 targets are to be submitted to CEQ and OMB on June 2, 2010

could only estimate a scope 3 category's size relative to other categories (e.g. in terms of a percentage, and not in terms of MTCO₂e) in the scope 3 target tool, then the agency is not required to report emissions in that emissions category for FY 2010 reporting.

Agencies may report additional scope 3 emissions resulting from activities that are unique to an individual agency for which no methodologies are provided with this Guidance. Some examples associated with land management agencies include emissions associated with:

- visitors to Federal sites (e.g., DOI's National Parks);
- third party oil, gas, and coal mine leasing activities;
- enteric fermentation, where releases occur by livestock not owned by an agency but occur on Federal land; and
- manure management systems, where the systems take place on Federal land, but are operated by others.

To the extent possible, agencies should use methodologies that are commonly accepted. This will ensure consistency in calculation approaches should those emission categories be required for reporting in future years. If an agency reports emissions in a category where no commonly accepted methodology is available, that agency shall document and submit the calculation methodologies used as part of their annual inventory.

When determining whether or not to include optional scope 3 categories in their annual inventories, agencies should consider:

- whether the emissions associated with the category are sizeable enough to warrant measurement and tracking (see Chapter 2.3 regarding *de minimis* emissions);
- the feasibility and cost of collecting the required data;
- the level of influence an agency may have in reducing associated emissions; and
- the estimated cost of measuring and making reductions.

In the event that additional categories are required for inventories and reduction goals, agencies may be required to adjust their base year and annual inventories. This process is discussed in Chapter 5.4.

Other Vendor and Contractor Emissions

Vendor and contractor emissions are emissions associated with the services, materials, and products an agency purchases. They are a category of scope 3 emissions. These emissions can make up a large portion of an agency's overall emissions, so agencies are encouraged to begin looking at ways to account for vendor and contractor emissions.

Agencies are not required to report emissions related to their vendors and contractors at this time, but future inventories shall include vendor and contractor emissions to the greatest extent feasible.³² Section 13 of EO 13514 requires the GSA, in coordination with DoD and EPA, to

³² Agencies should note that outsourcing activities, such as IT services and data centers, is not a useful GHG reduction strategy since outsourcing would trigger a base year recalculation. See Chapter 5.3 for further details.

provide recommendations to CEQ and OMB on the feasibility of tracking and reducing GHG emissions from vendors and contractors.

2.2.4. Emissions Reported Outside of the Scopes

Other emissions that fall outside of the three scopes are either required or optional for reporting as described below.

In their FY 2008 base year and FY 2010 annual inventories, agencies shall separately report outside of the three scopes emissions associated with the CO₂ emissions from the biogenic portion of biofuel and biomass combustion.³³ These are known as biogenic emissions.

In their FY 2008 base year and FY 2010 annual inventories, agencies may separately report outside of the three scopes types of GHGs that are not covered by the EO. For example, agencies may optionally report non-covered GHGs with high global warming potentials such as NF₃. In addition, agencies may choose to track ozone depleting substances (ODSs) because some PFCs and HFCs are used as replacements for ODSs.

2.3. *de minimis*

In emissions accounting, *de minimis* refers to a minimum emissions accounting threshold below which reporting is not required. For Federal agency GHG inventories, there is no *de minimis* reporting threshold for required emission categories, as described in Chapter 2.2. Agencies shall use the following approach to address small or trace quantities of emissions for which full accounting may be particularly difficult or costly:

1. Identify emission sources that cannot be calculated using the recommended calculation procedures provided in this Guidance because the requisite data are not available, or is too difficult or costly to obtain.
2. Refer to this Guidance for alternative estimation methodologies. Alternative estimation methodologies are provided for scope 1 fugitive emissions and several scope 3 emission sources.
3. If the Guidance does not contain a simplified estimation methodology for the emission source in question, agencies may develop their own alternative calculation methodologies. The rationale and methodology for these calculations shall be thoroughly documented through an agency's GHG reporting (see Chapter 5).
4. If a simplified calculation methodology is not available in this Guidance, and an agency cannot develop an acceptable alternative calculation methodology, then, the agency shall explicitly detail and report its rationale for excluding the emission source.

In all cases, Federal agencies shall ensure that all methods, procedures and tools utilized in completing a GHG report are transparently detailed in their qualitative statement when reporting.

³³ The CH₄ and N₂O emissions resulting from biomass and biofuel combustion are required in scope 1 reporting

3.0 Sequestration and Emissions from Land Use, Agriculture, and Biogenic Sources

This chapter summarizes accounting requirements and references appropriate methodologies for several categories of emissions from biological sources that may result from agency land use and agricultural practices. It also addresses the treatment of biological sequestration of emissions in this Guidance.

For the purpose of the Guidance, two categories of biogenic emissions are required for reporting: biofuels combustion and biomass combustion. Biofuels are liquid or gaseous fuels containing biologically-derived substances combusted to generate energy. Examples include biodiesel and ethanol blended fuels.³⁴ Biomass is solid biological matter diverted for use as a fuel, such as wood and grass pellets.

Emissions from agricultural management activities including enteric fermentation, manure management, and composting, are discussed in this chapter. Reporting on these categories is not required, but agencies may report them voluntarily. Agencies may engage in manure management and other agricultural management activities for several reasons, including but not limited to clean waterway maintenance, pollution reduction, and healthy wildlands maintenance. In some cases these activities may compete with GHG reduction objectives. This Guidance does not attempt to establish priorities among GHG reductions and land and agricultural management activities. Voluntarily reporting of these emissions aims only to provide agencies with a reliable picture of their GHG impact.

Besides these emissions, this chapter also includes a discussion of biological sequestration and land management. Reporting on biological sequestration is not required at this time. Moreover, emissions from wildfire management and prescribed burning shall not be reported. Future revisions to this Guidance will incorporate recommendations from a Federal working group tasked with developing a methodology for measuring the carbon fluxes and biological sequestration that take place on Federal lands as a result of land management practices.

See the TSD for information on reporting requirements, calculation methods, data sources, and example calculations for biofuels and biomass.

3.1. Biofuel Combustion

Biofuels are liquid or gas fuels created partially or wholly from plant or animal matter. Part or all of the carbon in these fuels comes from carbon that was fixed by biological sources in the recent past, so depending on the full emissions impact of biomass production and use, they may not represent a net increase in the atmospheric carbon (since the carbon was removed from the atmosphere while the plant was alive). This contrasts with carbon from fossil fuels, which was removed from the atmosphere millions of years ago, hence its combustion represents a net increase in atmospheric carbon that would not have naturally occurred.

³⁴ Biogases yielded from landfills are not explicitly discussed in this chapter, although they may be considered a biofuel.

Although the CO₂ emissions from the biogenic portion of these fuels are not counted in scope 1, biogenic CO₂ emissions shall be reported separately in a biogenic reporting category. The CH₄ and N₂O shall, however, be reported as scope 1 emissions. This is because the CO₂ from biogenic sources is assumed to be naturally “recycled”, since the carbon in the biofuel was in the atmosphere before the plant was grown and would have been released normally through decomposition after the plant died. The CH₄ and N₂O emissions from biogenic sources, however, were not absorbed during plant growth so their release during combustion results in a net increase of GHGs in the atmosphere. Conversely, all GHGs in fossil fuels have been contained in geologic formations for millennia, and thus represent a net increase in atmospheric GHG. For this reason, all fossil fuel portions of biofuel blends shall be reported as scope 1.

3.2. Biomass Combustion

Biomass combustion refers to the burning of solid plant material to produce energy. Biomass is differentiated from biofuels because it is in solid form and is usually burned in stationary facilities, such as boilers, backup generators, or incinerators. In these cases the biomass fuel is usually wood or wood waste, but may also include grass pellets or other agricultural plant (vegetative) materials. Federal agencies are not required to inventory biomass emissions resulting from wildland fires or prescribed burns.

As with biofuels, the CO₂ from combustion of biomass shall not be included in scope 1 but shall be reported separately. The CH₄ and N₂O emissions associated with the biomass combustion shall also be reported as scope 1.

3.3. Emissions and Biological Sequestration from Land Management Techniques

Sequestration refers to the storage of carbon to reduce atmospheric carbon and mitigate the effects of climate change. For the purposes of Federal land managers, biological sequestration occurs when atmospheric carbon is absorbed by plants or soils. Land management techniques, including changes in land use or land management strategies, can and do have a significant effect on atmospheric carbon release and biological sequestration. Within a parcel of land carbon stocks may decrease (when carbon is released into the atmosphere through combustion and decay) or increase (when carbon is stored during tree growth or through soil absorption). Biological sequestration within a particular time period (e.g., 5 years) is the net increase of carbon stored within a parcel of land, while the net decrease is considered an emission. In other words, a standing forest that exists today is not, in and of itself, considered sequestration. Any carbon that is stored within that forest as it grows over time would be considered sequestration.

Agency-level reporting of emissions and sequestration as a result of land management practices is not required at this time. Emissions from wildfire management and prescribed burning shall not be reported.

The relevant calculations for sequestration are complex, especially when multiple ecosystem types and a variety of management practices are considered. Currently EPA prepares an annual report on the National Inventory of Greenhouse Gas Emissions and Sinks at the national scale, which is appropriate for national and international discussions. The data in the Report, however,

are presented at a resolution too coarse to address the effects of specific Federal land management practices on GHG emissions, sequestration, and fluxes. The U.S. Department of Agriculture (USDA) Forest Service Forest Inventory and Analysis Program collects data that can be used to quantify carbon stocks and fluxes on federal lands, but additional data analysis would be required to present the data at a scale appropriate for small landholdings. In addition, the U.S. Geological Survey is acting to fulfill Congress' mandate to develop a methodology for a national assessment of current and potential GHG stores and fluxes in ecosystems. This methodology, which is expected to provide data at a resolution more appropriate for small landholdings, will be completed in 2010, and will use as a starting point the existing GHG inventories and methodologies published by USDA and EPA.

During FY 2010 and FY 2011, a subcommittee of Federal land managers and scientists with expertise in GHG measurement and monitoring techniques, including remote sensing, will be tasked with developing guidance recommendations on measuring the impact of sequestration associated with land management. These recommendations will be implemented at a scale and level of accuracy appropriate to the objectives of EO 13514. This subcommittee of the GHG Workgroup described in Chapter 1 will:

- Evaluate existing models and data, as well as existing and future peer-reviewed methodologies, to assess current and potential GHG stores and fluxes in ecosystems.
- Recommend how these data, models, methodologies and techniques should be utilized to account for: 1) GHG sequestration and emissions from Federal land management practices, and 2) total GHG sequestration and emissions from Federal lands at appropriate spatial scales.
- Achieve significant cost efficiencies and uniformity of accepted practices to detect and measure GHG storage and fluxes on Federal lands.

Until this Guidance is developed, agencies shall not include sequestration or emissions associated with any land-use, land-use changes, or land management techniques in their reporting.

3.4. Enteric Fermentation

Enteric fermentation refers to fermentation that takes place in the digestive systems of ruminant animals (cattle, buffalo, sheep, goats, and camels) which have a large "fore-stomach," or rumen, within which microbial fermentation breaks down food into soluble products. The microbial fermentation that occurs in the rumen enables ruminant animals to digest coarse plant material for food—it also produces methane gas. Even though this methane theoretically comes from a biogenic source, in the case of livestock managed by Federal agencies, the animals exist for anthropogenic reasons. As such their emissions are considered anthropogenic and are typically reported as either scope 1 or 3 (as opposed to the unique out-of-scope biogenic categories discussed above and in the TSD).

Reporting the emissions from enteric fermentation is not required at this time, but they may be optionally reported. If the animals in question are owned by the federal agency, these emissions

are optionally reported as scope 1. If releases occur by animals not owned by an agency but occur on Federal land, these emissions are optionally reported as scope 3.³⁵ Agencies shall not report releases that occur by undomesticated ruminants that are a part of a wildlife management program or by wild animals roaming Federal lands (e.g. a herd of elk in a National Park).

3.5. Composting

Composting may generate GHG emissions through the biodegradation of organic plant matter performed by bacteria, yeast and fungi. Although composting of organic waste, such as food waste and grass clippings, is uncommon in many agencies, it remains an effective way to reduce landfill waste.

Reporting the emissions from composting is not required at this time. The methodology is still being developed and refined. As knowledge increases regarding the measurement of emissions from composting, this section may be updated with additional guidance.

3.6. Manure Management

Manure in large quantities can pose a risk of pollution to waterways and ecosystems. As a result, large-scale livestock operations often store and/or stabilize manure with a manure management system. These systems can include, but are not limited to, anaerobic lagoons, liquid slurry systems, storage pits, digesters, solid storage systems, dry lots, composting, incineration, and aerobic systems. They do not include natural pasturing, manure land application, daily spread systems, or off-site composting.

Reporting the emissions from manure management systems is not required at this time, but they may be optionally reported. If emissions from these systems reported are owned or controlled by the agency, these emissions are optionally reported as scope 1. If the systems take place on Federal land, but are operated by others, these emissions are optionally reported as scope 3.³⁶

³⁵ Data sources and the calculation methodology regarding enteric fermentation can be found in *Emissions Factors & AP 42, Fifth Ed., Volume I* Chapter 14, Supplement D.

³⁶ Methodologies, data sources, emission factors, and further discussion of these issues can be found in the EPA's Mandatory Reporting of Greenhouse Gases Rule outlined at <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html> or in the Federal Registry, Vol. 74, No. 209, in Subpart JJ.

4.0 Renewable Energy and Carbon Offsets

Renewable energy is defined as energy derived from resources that can be renewed indefinitely, including solar, wind, biomass, landfill gas, ocean (including tidal, wave, current and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.³⁷ Renewable energy can reduce GHG emissions by displacing conventional fossil fuel use.

Under this Guidance the emission reductions associated with renewable energy purchases or onsite renewable electric generation, including renewable energy certificates (RECs), are indirect and may be used only to reduce a purchaser's scope 2 emissions from electricity use.³⁸ Direct emissions reductions resulting from renewable energy purchases or on-site electric generation are typically realized at conventional generating facilities owned by entities other than the renewable energy purchaser or supplier. Reporting for this type of energy use is covered in the Technical Support Document. The exception occurs when an on-site generator is displacing the direct use of fossil-fuels within an agency's organizational boundary, thus reducing scope 1 emissions, as addressed in Chapter 4.2.

Carbon offsets are created by projects outside an agency's organizational boundary, such as methane capture or reforestation projects, that reduce the amount of carbon dioxide or greenhouse gases emitted into the atmosphere and are used to offset or compensate for emissions elsewhere. Typically, a carbon offset is a tradable commodity representing a reduction or avoidance of one metric ton of carbon dioxide equivalent (CO₂e). Offsets are sometimes purchased by consumers or organizations to "offset" or compensate for their own emissions, such as those associated with energy consumption, vehicle use, air travel, or product manufacturing (i.e., scopes 1, 2 and 3). In this way, consumers pay to support the development of offset projects that result in emissions reductions. Offsets are also often used in regulatory cap and trade programs to provide compliance options for emitters to help minimize compliance costs. Carbon offsets are not eligible at this time to reduce an agency's emissions because Federal agencies have not yet established guidelines for offset eligibility.

This chapter provides agencies with guidance on measuring and accounting for emissions resulting from their purchase or use of renewable energy. The Technical Support Document deals with calculations for non-electric renewable energy. This Guidance considers the current legislative and regulatory environment with regard to renewable energy and carbon offsets. The adoption of new regulations related to climate change could affect the role of RECs and carbon offsets in meeting agency GHG targets. This Guidance will be updated as necessary to reflect changes in policies or regulations.

Facilities that have purchased renewable energy and RECs in the base year (FY 2008) shall not have the credits included in the base year calculation to ensure they are not unduly penalized for

³⁷ For definition of renewable energy, see Executive Order 13514: www.eere.energy.gov/femp/regulations/eo13514.html

³⁸ Guidelines for eligible RECs are defined in FEMP's Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423: www.eere.energy.gov/femp/regulations/eo13423.html

proactive investment. However, limits on the use of RECs for reducing scope 2 emissions will be considered in future revisions to this Guidance.

4.1. Renewable Energy Purchases, including Renewable Energy Certificates

Federal agencies may reduce their scope 2 emissions by purchasing energy generated from renewable energy sources, including their renewable energy and environmental attributes embodied in renewable energy certificates (RECs). A REC is a certificate issued when one MWh of electricity is generated and delivered to the grid from a renewable energy source. RECs are generally defined by states and certification organizations to contain the “environmental attributes” of electricity generated from renewable energy sources. This allows REC owners to claim the attributes of renewable energy (e.g. GHG emissions benefits) when matched with conventional electricity. Buyers can purchase RECs based on the generation resource (e.g., wind, solar, geothermal), year, and location.

A purchase of electricity from a renewable energy generator shall, for purposes of this Guidance, include ownership of the RECs or preclude ownership of the renewable energy and environmental attributes of the electricity by any other party. Otherwise, this Guidance does not recognize it as a purchase of renewable energy. The agency can no longer claim to be using renewable electricity if another party owns the RECs or environmental attributes and shall report scope 2 emissions from the electricity as if it were from a conventional generator. Ownership of these attributes should be explicitly stated in a contract. This ensures that the environmental attributes from the renewable energy generation are not owned by another party, thereby avoiding double counting.

To account for REC or renewable energy purchases, the scope 2 emissions from agencies’ electricity purchases are adjusted to reflect the lower emissions from the purchase of renewable electricity, regardless of whether the agency purchases RECs bundled with energy or unbundled. Because the emission reduction benefit of renewable energy is derived from displacing other generation sources, agencies must pay particular attention to the location (region) of the generators that produced the electricity or RECs. When purchasing renewable electricity or RECs, the emission factor used to calculate reductions in the agency’s scope 2 emissions must reflect the region in which the renewable generator is located. A different mix of generating resources will be displaced by renewable energy generation depending on the region in which the generation occurs. It is also important to report whether the generator is on the site where the renewable energy is consumed or is being delivered through the electric grid, because for on-site projects scope 3 transmission and distribution losses are eliminated. For off-site projects transmission and distribution losses are the same as electricity from a utility. Transmission and distribution GHG factors are included in the Technical Support Document. GHG emission impacts should always be based on the e-Grid non-baseload output emission rates, which are appropriate for measures that reduce GHG emissions by reducing electricity use.³⁹

³⁹ See “Total, Non-baseload, eGRID Subregion, State - Guidance on the Use of eGRID Output Emission Rates,” S. S. Rothschild, E.H. Pechan & Associates; A. Diem, US EPA OAP
<http://www.epa.gov/ttn/chief/conference/ei18/session5/rothschild.pdf>

Therefore, it is important that an agency's contract with a REC provider specifies the resource type and region the RECs are sourced from so that the appropriate eGRID non-baseload output emission rate can be used to quantify the scope 2 emission reductions. Verifiable REC tracking services are available that monitor and report on these and other attributes of RECs. Agencies are encouraged to use these services where they make sense. Federal agencies are required to include third-party verification of Renewable Energy and REC purchases under FEMP's Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423.⁴⁰ Further requirements for verification of REC purchases will be considered in future revisions to this Guidance.

Purchase of Electricity and/or RECs from Biomass Combustion

Biomass combustion leads to both CO₂ and non-CO₂ GHG emissions in the form of CH₄ and N₂O. Consistent with existing CO₂ reporting programs, CO₂ emissions from biomass combustion are reported separately from emissions from fossil fuels on the assumption that they are recaptured when the biomass is regrown. Emissions of CH₄ and N₂O from the combustion of biomass and biomass-based fuels are not segregated and reported separately because they are not recaptured during regrowth.⁴¹ If purchased renewable electricity comes from biomass combustion, including biomass-based RECs, then emissions of CH₄ and N₂O shall be reported as additions to scope 2 emissions. However, emissions from agency-owned generation from biomass and waste-to-energy (WTE) were included in baseline calculations using the targeting tool.⁴² As a result, agencies will need to revisit their 2008 base year inventories to include biomass and WTE emissions from agency-owned facilities. The default calculation methodology for addressing the CH₄ and N₂O emissions from biomass and WTE can be found in the Technical Support Document.

If the biomass-fueled electric generator is owned by the agency, see further guidance in Chapter 4.2 for On-site Generation.

Purchase of Electricity and/or RECs from the Conversion of Landfill Gas

A common method for reducing emissions from landfills is the collection and combustion of landfill methane gas. At some landfills, gas is combusted by flaring; at others, gas is combusted to produce energy. Agencies that purchase renewable electricity or RECs from the conversion of landfill gas to energy should report only the indirect emission reductions from the displacement of fossil generation on the electric grid. Direct emission reductions from capturing the landfill gas prior to energy generation are not part of the agency's emission reduction (unless the agency

⁴⁰ FEMP's Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423: www.eere.energy.gov/femp/regulations/eo13423.html

⁴¹ CO₂ emissions from biomass combustion are reported separately because the carbon in biomass is of a biogenic origin, i.e., it was recently contained in living organic matter. However the carbon in fossil fuels has been trapped in geologic formations for millennia. This procedure aligns with the EPA Climate Leaders program, the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, and other GHG reporting programs.

⁴² Note that RECs, including from biomass and WTE, are not to be included in agency FY 2008 base year inventories, so this adjustment is only necessary for annual inventories in FY 2010 and beyond.

owns the landfill), and are not conveyed to the purchasers of electricity or RECs from landfill gas to energy projects.⁴³

Purchase of Electricity or RECs from Municipal Solid Waste Combustion

The combustion of municipal solid waste (MSW) at WTE facilities is an eligible renewable resource. Although MSW consists largely of renewable biogenic resources such as food, paper, and wood products, a significant portion is nonrenewable materials derived from fossil fuels, such as plastics and tires. As a result, EPA's Mandatory Reporting of Greenhouse Gases Rule requires large WTE facilities that are subject to the rule to separately report their biogenic carbon dioxide emissions and non-biogenic, or fossil-derived, carbon dioxide emissions.⁴⁴ Assumptions regarding biomass content in waste are incorporated into the default WTE emission approach included in the Technical Support Document.

Agencies interested in reducing their scope 2 emissions by purchasing electricity or RECs sourced from WTE must ensure that the RECs and electricity were created from the renewable portion of the waste stream. WTE facilities reporting their biogenic carbon dioxide emissions and anthropogenic greenhouse gas emissions to EPA under the Mandatory Reporting rule should be able to provide this information to the electricity provider or REC vendor.

4.2. On-Site Renewable Energy

If an agency owns an on-site renewable generating facility and the RECs associated with its output, GHG emission reductions from the facility shall be accounted for in scope 2 emissions. Renewable energy use shall be reported separately from conventional energy and fuel use and identified as on-site generation whether it is owned by the agency or by a third party that is delivering the renewable energy and/or RECs from the system to the agency. In addition to scope 2 reductions, all on-site renewable energy creates scope 3 transmission and distribution emission reductions. As discussed earlier in this chapter, if the renewable energy is based on biomass or WTE CH₄ and N₂O emissions as well as emissions from the non-biomass content in WTE shall be added to scope 1 emissions if the facility is owned by the agency; if the electricity is purchased it is added to scope 2 emissions.

For agencies generating on-site renewable electricity that reduces on-site natural gas use or other fossil fuel combustion, the lower fossil fuel use resulting from the system should be automatically reflected in reduced scope 1 emissions when the agency reports less fossil fuel use. There is no need for a separate GHG calculation for the fossil fuel displaced by the renewable electricity.

⁴³ This treatment is consistent with the EPA's Climate Leaders and Green Power Partnership. See U.S. Environmental Protection Agency, Climate Leaders Greenhouse Gas Inventory Protocol Offset Project Methodology for Project Type: Landfill Methane Collection and Combustion (August 2008), p. 3, at http://www.epa.gov/climateleaders/documents/resources/draft_landfill_offset_protocol.pdf and EPA Green Power Partnership, Partnership Requirements (April 2009), p. 10, at http://www.epa.gov/greenpower/documents/gpp_partnership_reqs.pdf.

⁴⁴ More information about EPA's Mandatory Reporting of Greenhouse Gases Rule can be found at <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>.

Ownership of RECs from On-site Renewable Electricity Generation

If an agency does not own the RECs from an on-site renewable energy system, even if it owns the equipment and uses the electricity, the agency shall adjust its scope 1 and scope 2 emissions. If an agency gives up ownership of the RECs, the contractual claim for the environmental attributes of the system transfers to the owner of the RECs. The agency shall report emissions for the electricity associated with the RECs as if it is conventional electricity in its scope 2 accounting using the eGRID subregion non-baseload output emission rate corresponding to the eGRID subregion of electricity generation. Agencies report separately the electricity and energy associated with any on-site renewable energy system where RECs are not owned by the agency.

Third Party Ownership of On-Site Systems

Agencies may host an on-site energy system at their facility without owning the system. For example, a third party may own the system and sell electricity to the agency through a Power Purchase Agreement. Because the on-site system is not under the operational control of the agency, all associated emissions from energy purchased from the system should be reported in scope 2. If the agency purchases the RECs from the on-site generator, either bundled or unbundled with the electricity, its GHG emission impacts are calculated the same way as an on-site generator owned by the agency, as described at the beginning of this section.

If the agency does not contractually retain the RECs from the on-site system, the agency shall report the electricity purchase as grid-based electricity and use the eGRID subregion non-baseload output emission rate corresponding to the eGRID subregion where the generator is located (in this case the same region as the site), for its scope 2 report.

On-Site Renewable Energy, Not Generating Electricity

On-site renewable energy systems that do not generate electricity but generate thermal energy, such as solar water heating, ground source heat pumps, and geothermal direct use, may be a cost-effective way to reduce thermal loads and, thus, GHG emissions. Whether the agency owns such on-site systems, or is paying for them under a performance contract, there are no special steps required to report emissions. Such systems reduce the agency's generation and/or purchase of electricity, natural gas or other conventional energy sources. The reductions of natural gas or other fossil fuel combusted on-site would be reflected in the agency's scope 1 emissions, while the reduced purchase of electricity or conventional non-electric energy would be reflected in the agency's scope 2 emissions. Agencies should input system characteristics in the GHG Reporting Portal to receive proper GHG emission credit and for EPA's Act and EO 13423 renewable energy goal reporting. These systems also produce scope 3 transmission and distribution GHG reductions.

Agencies that own on-site systems that rely on biomass to produce non-electric energy (heat) shall adjust their scope 1 emissions to reflect the emissions from the on-site biomass boiler. Agencies should remember, however, that biomass combustion involves fuels whose production and delivery (even from on-site wastes) can produce GHG emissions, especially CH₄ and N₂O. If the conversion equipment is owned by another entity that delivers steam, heated air or hot

water as the product, the emissions from the system should be reported as scope 2 emissions (See Technical Support Document for calculations).

If an agency owns, or a third party installs, on-site renewable energy systems that produce thermal energy, such energy production may create environmental attributes that are the non-electric equivalent of RECs.⁴⁶ If the agency does not contractually retain these environmental attributes from the on-site system, the agency shall report emissions as if it had not undertaken the on-site thermal energy measures.

⁴⁶ Markets for RECs from these types of projects are very limited today. Tracking systems may not issue and track ownership of these attributes, especially if the application is to reduce gas usage. Agencies should be cautious about purchasing or selling these attributes until markets develop along with more rigorous verification and tracking systems. Until stronger standards develop agencies must require rigorous third-party verification and certification of any environmental claims associated with non-electric renewable energy projects and ensure that any agreement is consistent with the general requirements for RECs in this guidance.

5.0 Reporting GHG Emissions

The purpose of this chapter is to communicate the GHG reporting process, the use of emission factors in this Guidance, and procedures for inventory recalculations. More details on requirements for qualitative and quantitative data are contained in the TSD.

5.1. Reporting Process

Annual Date for Reporting

Reporting of FY 2010 GHG emissions shall occur by January 31, 2011 and, annually thereafter for the preceding fiscal year. Agencies shall submit their FY 2008 base year inventory on the same date. Both the FY 2008 and FY 2010 inventories shall be calculated using this Guidance.

As necessary, agencies shall include updates and corrections to GHG emissions reports from previous years at the same time of its annual report submission.

Electronic GHG Reporting Portal

Section 9(b) of EO 13514 requires DOE, in coordination with other agencies, to provide the necessary electronic reporting capability so that agencies can report their GHG inventories in a consistent and accurate manner. This reporting capability, or GHG Reporting Portal, will be operational by October 5, 2010 as required by EO 13514. The portal will be made freely available for agency use. Agencies shall use the GHG Reporting Portal to submit their FY 2008, FY 2010, and subsequent annual GHG inventories.

The GHG Reporting Portal will accurately represent current GHG reporting requirements and **provide GHG calculation functionality for the minimum required data described below and in the TSD**. Current FEMP energy reporting will be integrated into this portal to reduce the reporting burden for agencies. Data residing in the FAST database will automatically be transferred to the GHG Reporting Portal, and FEMP will work to enable data sharing with other relevant Federal data systems. FEMP will provide training and other support tools to facilitate agency access to the portal. FEMP will also provide agencies with a spreadsheet-based data entry and calculation aid to assist with the preparation of the GHG report. Agencies may also choose to utilize this aid for facility-level GHG calculation and planning efforts.

Reporting Approach

Emission categories are broken down into required reporting and optional reporting, as described in Chapter 2. For each of the required categories, there exists a calculation methodology that allows for the “**minimum required**” data to be entered into the GHG Reporting Portal. If using the minimum required methodology, agencies must input activity level data, some of which can be leveraged from existing programs and collection systems (e.g., FEMP Energy Report, FAST database). Calculation methodologies and emission factors are embedded into the GHG Reporting Portal and will automatically calculate GHG emissions associated with the reported activity data.

For many emission categories, “**detailed**” methodologies are also available, which can provide more accurate GHG accounting. Agencies may report using these detailed methodologies *instead* of the minimum required methodologies, but their use is not required at this time. As agencies become more familiar with GHG reporting, they are encouraged to utilize the detailed methodologies to increase the methodological accuracy of their inventories. To the greatest extent feasible, the GHG Reporting Portal will also automatically calculate emissions based on the type of activity data required to use the detailed methodologies. If the portal does not provide this function for a detailed methodology, agencies will need to calculate the emissions, and then enter the quantities of each GHG emitted in units of metric tons. Minimum required and detailed methodologies are included in the Technical Support Document.

For required emission categories, agencies shall report using either the minimum required methodology or detailed methodology. As noted in Chapter 2, there are also **optional** reporting categories, including some scope 3 emissions and specified land-use and agricultural emissions. The GHG Reporting Portal will not automatically calculate emissions from these categories based on entered activity level data. Agencies choosing to report emissions for these optional categories will need to calculate emissions, and then enter the quantities of each GHG emitted in units of metric tons.

Detailed Calculation Example: Landfills

To illustrate how a detailed methodology might be used, consider an agency that manages a total of five landfills at different facilities, all of which are maintained and reported as part of the facilities’ Clean Air Act (CAA) Title V permits. The agency’s GHG lead works with each facility’s Air Program Manager to determine the site-specific variables for each landfill are already readily available. During this process, the agency determines that the landfills have been closed for several decades and emit lower amounts of CH₄ than reflected when using the Scope 1 minimum required methodology. Given that the data is available, the agency GHG lead chooses to use the detailed GHG calculation methodology to calculate each of the five landfill’s respective emissions and to report the total metric tons of CH₄ emissions under the Solid Waste / Landfill emission category in the GHG reporting portal.

Other GHG Calculation Tools

While selected qualitative and quantitative GHG data shall be submitted annually into the GHG Reporting Portal, this Guidance does not stipulate the use of any other particular GHG inventory calculation tool. Many agencies already have some experience developing GHG inventories, and as a result, may have a preferred tool to assist with calculating and managing GHG information. This Guidance is designed to integrate activity data for GHG reporting with other existing reporting requirements where possible, thereby allowing agencies to leverage tools and databases currently in place.

If other GHG calculation tools are used, however, agencies should ensure that they comply with the methods and procedures described in this Guidance.⁴⁷ Different tools may produce different results depending on the calculation methodologies used. For this reason, agencies should evaluate calculation tools carefully prior to use and are encouraged to work with FEMP to ensure that tools selected will produce results compatible with reporting requirements. FEMP will provide such services to agencies to the greatest extent practical. A list of GHG inventory tools that comply with the methods and procedures described in this Guidance will be available on the FEMP GHG website.

FEMP Energy and Greenhouse Gas Emissions Report

FEMP will use agency energy and GHG data submitted to the GHG Reporting Portal to develop a combined annual energy and GHG emissions report for submission to Congress. This combined report will take the place of the current FEMP Annual Energy Report beginning with FY 2010 reporting. Agencies shall continue to submit the narrative report currently required for the FEMP Energy Report. Agency policies for making agency-specific GHG inventories publicly available shall be consistent with Section 1 of EO 13514.

Along with this GHG accounting and reporting guidance, there currently exists a separate guidance document for annual energy reporting under EISA.⁴⁸ The next version of this Guidance will merge with the current energy reporting guidance to the greatest extent feasible.

Through the process of developing and reporting a GHG inventory, agencies will continue to gain expertise and lessons learned. FEMP will establish a clearinghouse to make sure all agencies have an opportunity to share these lessons learned.

5.2. Emission and Conversion Factors

To ensure accurate GHG inventories, it is vital to apply appropriate emission and conversion factors consistently across the government. This section provides an overview of the factors used in the minimum required calculation methodologies. More information on emission factors can be found in the TSD. This document will be revised by September 30 of each reporting year to incorporate the most accurate calculation methodologies and emission factors available, as necessary. The revised calculation methodologies are to be used in preparation of the GHG inventory for that reporting year.

Emission Factor and Calculation Methodology Selection

Emission factors and methodologies referenced in this Guidance were selected because of their applicability to Federal operations, technical authority, and acceptance in other GHG reporting programs. Calculation methods and emission factors were leveraged from existing GHG regulatory and voluntary inventory protocols, with the MRR given top priority when applicable,

⁴⁷ The calculations required for performing GHG inventories have been included in the appropriate sections of this Guidance.

⁴⁸ To see the current Reporting Guidance for the Annual Report to Congress, visit:
www.eere.energy.gov/femp/regulations/facility_requirements.html.

followed by other Federal sources. Emission factors and methodologies were selected from the following sources:

1. U.S. EPA, Mandatory Greenhouse Gas Reporting Rule (MRR), Federal Register, October 30, 2009, see: <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>
2. U.S. EPA, Climate Leaders Program, Technical Guidance, see: <http://www.epa.gov/stateply/resources/index.html>
3. U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks, see: <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>
4. U.S. EPA, Clean Energy Program, eGRID Tool Methods, see: <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>⁴⁹
5. U.S. DOE, 1605(b) Voluntary Reporting of Greenhouse Gases Program, Technical Guidelines, see: <http://www.eia.doe.gov/oiaf/1605/gdlins.html>
6. International Panel on Climate Change (IPCC), 2006 Guidelines for National Greenhouse Gas Inventories, see: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol1.html>

5.3. Base Year and Subsequent Year Recalculations

Agencies shall use FY 2008 as the base year for their comprehensive GHG inventory. Base year inventories shall be calculated using the methodologies and the reporting format outlined in this Guidance.

Agencies with cyclical operations or events may find that FY 2008 is not representative of their scope 1 fluorinated gas fugitive emissions (i.e., HFCs, PFCs, SF₆), particularly when limited to material procurement record data. In this case, agencies may calculate a three-year average base year value for the **specific scope 1 fugitive emission category**. This FY 2008 base year shall consist of the average scope 1 fluorinated gas fugitive emissions for FY 2006, FY 2007, and FY 2008. If an agency uses a three year average base year for fugitive emission, they shall continue to use a three year average for subsequent reporting years. For example, FY 2010 reporting in this category should report an average of FY 2008, FY 2009, and FY 2010. Use of this rolling average approach should be noted in the “Other Information” section of the agency’s qualitative statement. Agencies may NOT use the rolling average approach for their entire comprehensive inventory, but only for the fluorinated gas fugitive emissions category.

⁴⁹ For scope 2 electricity, the GHG reporting portal will utilize NERC subregion emission factors provided by the U.S. EPA eGRID database to calculate minimum required category GHG emissions. This database divides the electric grid into 26 subregions with unique emission factors based on the regional electricity generation mix. Agencies can map a facility’s zip code to the corresponding eGRID subregion using the EPA Power Profiler website. Agencies reporting facilities in U.S. territories or foreign nations shall utilize emission factors from DOE 1605(b) Technical Guidance Emission Factors.

In some cases, agencies may not have access to quality FY 2008 data, particularly for the scope 1 fugitive emissions and the some Scope 3 emission categories. When this occurs, agencies shall use the earliest year for which data are available to include in the FY 2008 base year inventory. For example, if an agency's employee commuting data becomes available in 2011, those emissions should be incorporated into the FY 2008 baseline.

Renewable energy purchases and RECs purchased in FY 2008 shall not be included in the FY 2008 base year scope 2 inventory. Renewable energy is not included in the FY 2008 baseline to set a fair baseline inventory and to avoid "penalizing" agencies that progressively purchased renewable power prior to the release of EO 13514.

To ensure a consistent comparison against a baseline that is representative of ongoing agency activities, it may be necessary to recalculate the base year and subsequent inventories. First, CEQ may direct an overall re-calculation of baseline based on improvements in methodology or the need to normalize data across the federal sector. Second, on an individual basis, agencies are responsible for determining when a recalculation is warranted. Agencies shall consider recalculating their base year and subsequent year emissions when:

- Agency structural changes significantly increase or decrease emissions relative to the base year.⁵⁰ A structural change involves the transfer of control of emissions-generating activities or operations from one agency to another. While a single structural change might not significantly impact the base year emissions, the cumulative effect of a number of minor structural changes can. Examples of structural changes include the following:
 - Reorganization, division, consolidation, or significant change of organizational activities;
 - Outsourcing or insourcing of activities.
- Data and/or methodologies for additional emission categories become available. For example, data may become available in FY 2011 for fugitive emissions that were not captured in FY 2010, or if CEQ releases methodologies for calculating emissions from biological sequestration.
- Changes in calculation methodology, or improvements in the accuracy of emission factors or activity data, significantly change calculated emissions relative to the base year.
- There is a discovery of errors, or a number of cumulative errors, that significantly increase or decrease emissions relative to the base year.
- A combination of the above result in a significant increase or decrease emissions relative to the base year.

⁵⁰ For further information, please refer to Chapter 5 of the PSS.

Because determining the significance of such changes in emissions is difficult to stipulate for the full range of government operations, agencies should individually develop and monitor an internal process by which changes in annual emissions are compared to knowledge of the events listed above. Such a comparison should take into account the complexities of the agency's operations, and should serve to highlight the possible need to perform a recalculation of the base year and subsequent years. When an agency determines that a base year emissions recalculation is needed, it shall provide a narrative description in the GHG Reporting Portal of the reasons for a recalculation, and a quantitative description of the impact of those changes on the inventory. CEQ will provide the final approval regarding the need to modify the base year calculation.

6.0 Verification and Validation of GHG Emissions

The purpose of GHG accounting verification is to provide confidence that reports of GHG emissions are complete, accurate, consistent, transparent and without significant errors.⁵¹

Agency Responsibilities

At a minimum, agencies shall verify that their inventories are *reliable* through a verification process that may be internal to the agency.⁵² External (third party) verification is NOT required but is an option agencies may consider. Agencies shall use **at least one** of the three processes described here:

1. Quality Assurance (Minimum Required): When an agency submits their GHG inventory, and therefore certifies that it is reliable, they can choose to include an Inventory Management Plan. This plan shall describe the agency's process for verifying the reliability of the inventory, and the plan to improve data quality over time.⁵³
2. Second-Party Verification: If verification is performed by an entity within the agency, this is termed second-party verification. Those performing the second-party verification for the agency shall be independent of those responsible for reporting the GHG emissions inventory. If second party verifiers are used, agencies shall identify the verifying entity in their annual reporting.
3. Third-Party Verification: If verification is performed by an external to the agency, this is termed third-party verification. Those performing the third-party verification for the agency shall be independent of those responsible for reporting the GHG emissions inventory. If third party verifiers are used, agencies shall identify the verifying organization in their annual reporting.

Agencies are encouraged to use either second-party or third-party verification for FY 2010. Groups performing the verification process for the agency may refer to the principles and requirements of ISO 14064-3:2006 for additional guidance on this process as needed.⁵⁴

The agency Senior Sustainability Officer shall certify that reported inventories are *reliable* via the certification provision in the GHG Reporting Portal. Agencies shall document any known errors identified through the verification process. Agencies shall provide this certification and documentation at the time the agency reports the data.⁵⁵

⁵¹ For brevity, we call a GHG report that satisfies these five criteria (complete, accurate, consistent, transparent and without significant errors) *reliable*.

⁵² For more information on Validation and Verification of GHG emissions, please refer to Chapter 10 of PSS found at: <http://www.ghgprotocol.org/files/provisional-draft.pdf>.

⁵³ For more information on Managing Inventory quality, please refer to Chapter 7 of PSS found at: <http://www.ghgprotocol.org/files/provisional-draft.pdf>.

⁵⁴ Greenhouse gases—Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.

⁵⁵ See Chapter Five for a discussion of timing and content of GHG emissions reporting.

FEMP Responsibilities

FEMP will provide a secure portal on the reporting website where the agency Senior Sustainability Officer can certify that the inventory is *reliable*.

FEMP will review the data submitted by the agency and follow up with agencies as appropriate to clarify questions on data quality. This data review is not the same as verification and does not substitute for or duplicate the verification done by agencies. Some of the data review done by FEMP will be incorporated within the GHG Reporting Portal as automated checks.

Appendix– Definitions

Key terms included in this Guidance are defined here. Relevant definitions derived from Section 19 of EO 13514 are displayed in *italics*.

Absolute greenhouse gas emissions. *Total greenhouse gas emissions without normalization for activity levels and includes any allowable consideration of sequestration.*

Agency. *An executive agency as defined in section 105 of title 5, United States Code, excluding the Government Accountability Office (EO 13514).*

Anthropogenic emissions. Emissions produced as a result of human activity that unnaturally releases CO₂ emissions into the atmosphere. One of the largest sources of anthropogenic CO₂ emissions is the combustion of fossil fuels or fossil fuel-based products to produce electricity.

Base year. A historic datum (e.g. a specific fiscal year) against which an organization's emissions are tracked over time.

Base year emissions recalculation. Recalculation of emissions in the base year to reflect a change in the structure of the organization, or to reflect a change in the accounting methodology used. This ensures data consistency over time, i.e., comparisons of like with like over time.

Biofuels. Liquid fuel made from plant material, e.g., wood, straw, and ethanol from plant matter.

Biogenic emissions. Emissions as a result of natural biological processes, such as the decomposition or combustion of vegetative matter. Biogenic emissions are part of a closed carbon loop. Biogenic CO₂ emissions are balanced by the natural uptake of CO₂ by growing vegetation, resulting in a net zero contribution of CO₂ emissions to the atmosphere. Examples of biogenic emission sources include burning vegetation (biomass) to produce electricity or using plant-based biofuels for transport.

Biological sequestration. The capture and storage of the atmospheric greenhouse gas carbon dioxide by biological processes, such as photosynthesis (through practices such as reforestation or preventing deforestation) or by enhanced soil carbon trapping in agriculture.

British Thermal Unit (Btu). The quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit at 39.2 degrees Fahrenheit.

Carbon offset. A tradable financial instrument that represents the sequestration, destruction, or reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases.

Carbon sequestration. The removal and storage of carbon from the atmosphere in carbon sinks (such as oceans, forests or soils) through physical/man-made or biological processes. Carbon sequestration consists of both biological sequestration and geological sequestration.

Certification. The method used to ensure that an agency's GHG emissions inventory (either the baseline or subsequent years) has met a minimum quality standard and complied with an appropriate set of procedures and protocols for submitting emissions inventory information.

CO₂ equivalent. The universal unit of measurement to indicate the global warming potential (GWP) of each of the six GHGs, expressed in terms of the GWP of one unit of CO₂. It is used to evaluate releasing (or avoiding releasing) different GHG emissions against a common basis. It is commonly expressed as (metric tons carbon dioxide equivalent) MT CO₂e, which is calculated by multiplying the metric tons of a gas by the appropriate GWP.

Cogeneration/combined heat and power. A facility producing both electricity and steam/heat using the same fuel supply.

Control approach. An emission accounting approach for defining organizational boundaries in which an organization reports 100 percent of the GHG emissions from operations under its financial or operational control.

Control. The ability of an organization to direct the policies of another operation. It is defined as either operational control (the organization or one of its subsidiaries has the full authority to introduce and implement operating policies at the operation) or financial control (the organization has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities).

de minimis. A minimum emissions accounting threshold below which reporting is not required. For Federal agency GHG inventories, there is no de minimis reporting threshold for required emission categories.

Direct GHG emissions. Emissions from sources that are owned or controlled by the reporting organization.

Double counting. Two or more reporting organizations take ownership of the same emissions or reductions within the same scope. Indirect emissions (scope 2 and 3) are inherently another entity's direct, scope 1 emissions.

eGRID non-baseload output emission rate. The output emission rate for plants in a certain aggregation (e.g. eGRID subregion) that combust fuel and have capacity factors less than 0.8, weighted by generation and a percent of generation determined by capacity factor.

Emission factor. A representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

Emissions. Gases and particles which are put into the air or emitted by various sources.

Fugitive emissions. Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing, transmission, storage, and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.

GHG sink. Any physical unit or process that stores GHGs, usually in reference to forests and underground/deep sea reservoirs of CO₂.

GHG source. Any physical unit or process which releases GHGs into the atmosphere.

Global warming potential (GWP). A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO₂.

Greenhouse Gases (GHG). *GHGs means Carbon Dioxide (CO₂), Nitrous Oxide (N₂O), Methane (CH₄), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur Hexafluoride (SF₆).*

HVAC. Heating Ventilation and Air Conditioning. The centralized mechanical system used to supply conditioned air throughout a building.

Hydrofluorocarbons (HFCs). One of the six primary GHGs primarily used as refrigerants, consists of a class of gases containing hydrogen, fluorine, and carbon, and possessing a range of GWP values from 120 to 12,000.

Indirect emissions. Emissions that are a consequence of the actions of a reporting entity, but are produced by sources owned or controlled by another entity. For example, emissions that occur at a utility's power plant as a result of electricity purchased by a Federal agency represent the agency's indirect emissions.

Intergovernmental Panel on Climate Change. International body of climate change scientists. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant to the understanding of the risk of human-induced climate change (www.ipcc.ch).

Inventory. A quantified list of an organization's GHG emissions and sources.

Livestock. Livestock refers to one or more domesticated animals raised in an agricultural setting to produce commodities (e.g. as food or fibre, or labor). Livestock generally are raised for profit or for subsistence. The term "livestock" in this document includes poultry or farmed fish. The definition of livestock excludes animals in a wildlife management program (e.g. a herd of elk in a National Park).

Methane (CH₄). One of the six primary GHGs, consisting of a single carbon atom and four hydrogen atoms, possessing a GWP of 21, and produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Municipal Solid Waste. A mixed material waste stream consisting of residential solid waste and some non-hazardous commercial, institutional, and industrial wastes. Municipal solid waste does not include construction and demolition waste materials.

Nitrous Oxide (N₂O). One of the six primary GHGs, consisting of a two nitrogen atoms and a single oxygen atom, possessing a GWP of 310, and typically generated as a result of soil cultivation practices (particularly the use of commercial and organic fertilizers) fossil fuel combustion, nitric acid production, and biomass burning..

Operation. A generic term used to denote any kind of business, irrespective of its organizational, governance, or legal structures. An operation can be a facility, subsidiary, affiliated company, or other form of joint venture.

Operational boundaries. The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting organization.

Operational control. Full authority to introduce and implement operating policies at an operation. Operational control is one of two ways to define the control approach.

Organizational boundaries. The boundaries that determine the operations owned or controlled by the reporting organization.

Perfluorocarbons (PFCs). One of the six primary GHGs, consists of a class of gases containing carbon and fluorine and typically emitted as by-products of industrial and manufacturing processes, and possessing GWPs ranging from 5,700 to 11,900.

Process emissions. Emissions generated from manufacturing processes, such as the CO₂ that arises from the breakdown of CaCO₃ during cement manufacture.

Renewable energy. *Energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.*

Reporting year. The fiscal year in which the emissions being reported occurred. For example, if emissions that occurred in fiscal year 2010 are being reported in 2011, the reporting year is fiscal year 2010.

Scope 1 emissions. *Direct greenhouse gas emissions from sources that are owned or controlled by the Federal agency.*

Scope 2 emissions. *Direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency.*

Scope 3 emissions. *Greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting.*

Sequestered atmospheric carbon. Carbon removed from the atmosphere by biological or geological sinks and stored in plant tissue or below ground. For the purposes of this document, sequestered atmospheric carbon does not include GHGs captured through carbon capture and storage.

Stationary combustion. Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces, etc.

Sulfur Hexafluoride (SF₆). One of the six primary GHGs, consisting of a single sulfur atom and six fluoride atoms, possessing a GWP of 23,900, and primarily used in electrical transmission and distribution systems.

Target. A reduction goal in absolute GHG emissions over time. Per EO 13514, agencies have targets for scope 1 and 2 GHG reductions and also scope 3 GHG reductions.

United Nations Framework Convention on Climate Change (UNFCCC). Signed in 1992 at the Rio Earth Summit, the UNFCCC is a milestone Convention on Climate Change treaty that provides an overall framework for international efforts to mitigate climate change. The Kyoto Protocol is a protocol to the UNFCCC.

United States. *Means the fifty States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, and the Northern Mariana Islands, and associated territorial waters and airspace.*

Verification. An assessment of the reliability (considering completeness and accuracy) of a GHG inventory. Independent verification can be either second-party or third-party verification.